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The National Energy Outlook 1980-1990

August 1980

One in a series of Shell Oil papers
dealing with topics
of national importance.

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In this paper, a barrel of Crude Oil Equivalent (COE) is used as a yardstick for comparing amounts of different forms of energy. Energy can be conveniently measured in terms of heat produced and a barrel of crude oil produces, on average, 5.8 million British Thermal Units (BTUs). Throughout, the term MM B/D represents million barrels a day expressed in COEs.

The notation % AAI refers to the Average Annual Increase percentage rate of growth (i.e., compounded).

This paper updates previous Shell assessments of the national energy supply and supersedes "The National Energy Outlook," June 1978

The National Energy Outlook 1980-1990

INTRODUCTION

Where We Have Come From

Our view of energy is very different today than it was ten years ago. During the 1970's Americans had to face harsh truths about their energy future. The beginning of the decade saw declining production of domestic oil and natural gas combined with increasing oil imports. The 1973-74 oil embargo spelled an abrupt end to the era of cheap energy: petroleum supplies were cut and prices raised to what were then considered unbelievable levels. Consumers reacted by using less high-priced oil, and with this moderation of demand, prices eased. By the mid-1970's there again seemed to be a comfortable margin between world oil demand and potential world supply, and many felt that this margin would exist well into the 1980's. Then another political shock: the Iranian revolution erased the supply/demand margin and prices rose sharply.

Where We Are

Today, almost 45% of our total energy is derived from oil, 40% of which is imported, and the majority of this imported oil comes from an internationally traded oil pool controlled by OPEC.* As world demands for oil increase, there appears to be a reluctance on the part of many OPEC oil exporters to increase production, even though blessed with large reserves. Their economies are unable to absorb additional revenues and their overseas investments have suffered inflationary losses. Furthermore, they wish to conserve this valuable petroleum resource for future generations. Political attitudes and the aims of individual domestic and foreign policies also are at play.

An assured foreign oil supply is a thing of the past, and it is now abundantly clear that the U.S. must solve its energy problem at home.

Looking Ahead

The necessary national goal of reducing dependence on foreign oil through better energy utilization and increased domestic supplies cannot be accomplished either quickly or easily. The problem is complex, since laws and policies that affect energy also affect our economy, our environment, the way we live and our relationship with other countries. In order for both government and industry to plan in this difficult climate, it is necessary to understand the probable results of today's decisions on tomorrow's energy. A projection which weighs and interrelates these decisions into a coherent pattern is one method of developing a realistic energy perspective.

Shell Oil Company's "The National Energy Outlook 1980-1990" was constructed to serve this purpose and is presented in the following pages. These projections do not reflect what Shell would like to see happen, but rather consist of what at this time we believe will occur, given present and expected policies and attitudes.

*OPEC (Organization of Petroleum Exporting Countries) embraces not only the Middle Eastern countries of Iraq, Iran, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates, but also Venezuela, Ecuador, Algeria, Libya, Gabon, Nigeria, and Indonesia.

UNDERLYING ASSUMPTIONS

The character of any projection is dependent on the assumptions that form its basic framework. Such assumptions (or premises) usually include: probable social and political change; economic developments; and the possibility of technological improvements. Are the premises reasonable for the projected time span? Are they internally consistent?

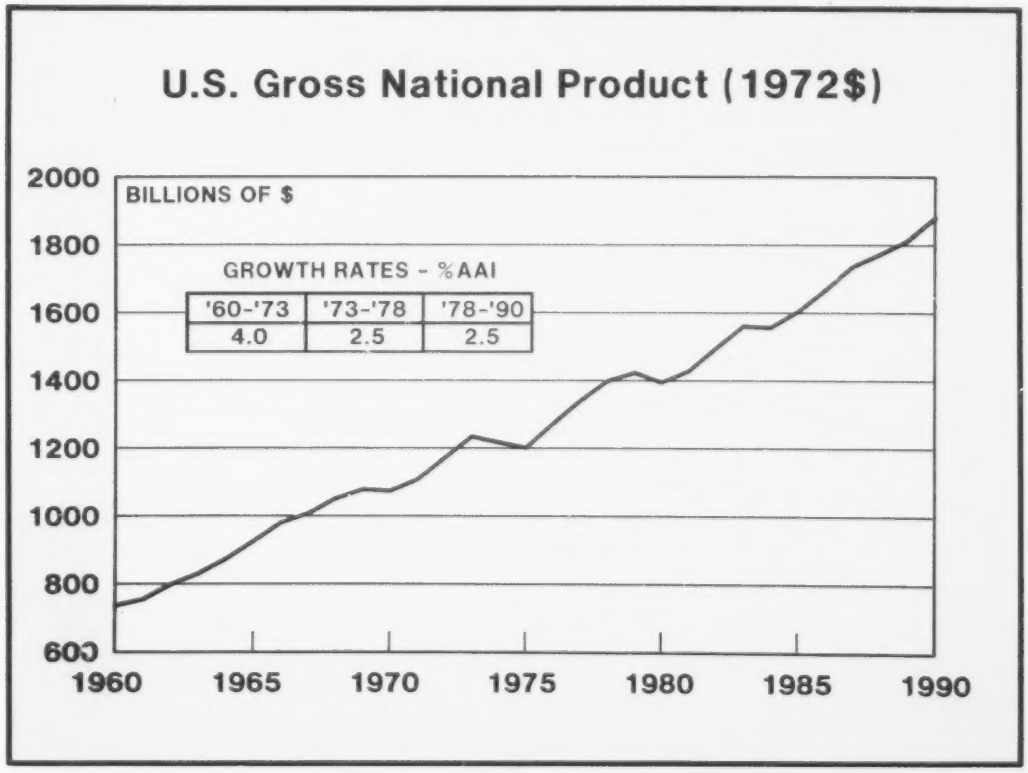
Of course, Shell considers the premises upon which this outlook is based to be reasonable, but no one can anticipate with assurance what actually will happen between now and 1990. Some events and policies that we expect may fail to materialize and other unforeseen events take place. To the extent that this occurs, this Outlook fails to perceive the future. However, we believe the general direction of our energy future presented here, and the major issues that it highlights, will remain valid.

A summary of some of the major assumptions used in the compilation of this Energy Outlook follows:

Gross National Product

Domestic economic growth, as measured by the Gross National Product (figure 1), will be slower than that of the 1960's and early 1970's, but about the same as that which occurred between 1973 and 1978. This slower growth largely results from a slower growing labor force, higher energy/prices and costs of meeting stringent environmental standards.

Figure 1



Inflation

The U.S. experienced periods of very high inflation in the last decade. We expect inflation, as measured by the GNP deflator, to be high (8-10%) in the early 1980's and to moderate to a 6-8% range by the late 1980's.

Labor Force

U.S. labor force growth will be less than a 2% average annual increase — from 100 million in 1978 to 122 million in 1990. Total population growth will be less than 1% annually.

Regulation and Federal Policy

While there will be less emphasis on price controls, other regulation of energy industries will continue. Allocations will direct fuels to preferred end users while tax incentives and subsidies will encourage a shift from imported oil to domestic energy.

In contrast, we anticipate little change in federal leasing or land management policies, and thus no greater access to energy resources on federal lands onshore or earlier access offshore. Air quality standards are not expected to become much more severe or to be moderated greatly.

Societal Attitudes

We assume that most people will continue to express only moderate concern for the nation's energy problems. As a reflection of this attitude, environmental/energy issues will continue to be marked by prolonged licensing processes and extensive litigation. However, we also expect that most responsibly planned energy projects, though delayed, will eventually go forward.

Conservation

The United States — individuals, business and industry — is making marked progress in energy conservation (see figures 2, 3, 4 and 5). This development is not recent; it has been underway for several years and we expect it to continue throughout the 1980's. The combination of a slower growing economy and continued advancement in the efficient uses of energy will limit growth of energy consumption through the 1980's.

New Technologies

Both government and industry will encourage development of new energy technologies. By 1990, coal gasification, coal liquefaction, shale oil, geothermal, and renewable sources such as solar energy will be contributing noticeably to the energy used in this country.

World Outlook

Economies other than centrally planned economies will expand more slowly than in the 60's, resulting in a much more moderate growth of world oil demand. A major assumption is that all industrialized nations will strive for better energy efficiencies and more use of non-oil fuels. This modest expansion of demand, along with the reluctance of several exporting nations to increase production, will keep world oil supplies tight and prices high during the 1980's.

Note: The figures on the following page are plotted using end-use or marketed energy. That is energy purchased directly by the downstream user— gasoline for automobiles, electricity for appliances, fuel for boilers, feedstock for petrochemicals, etc. It is considered to be a better indicator of consumer trends than gross energy input. Gross energy input includes losses incurred when converting one form of energy to another, such as coal to electricity or to liquids.

Figure 2

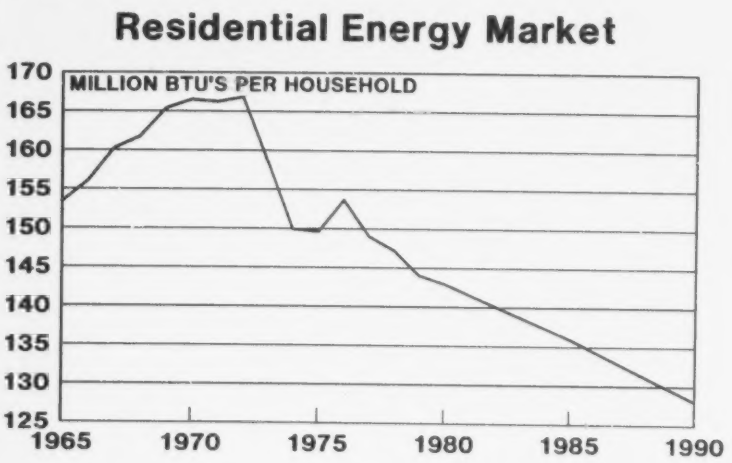


Figure 3

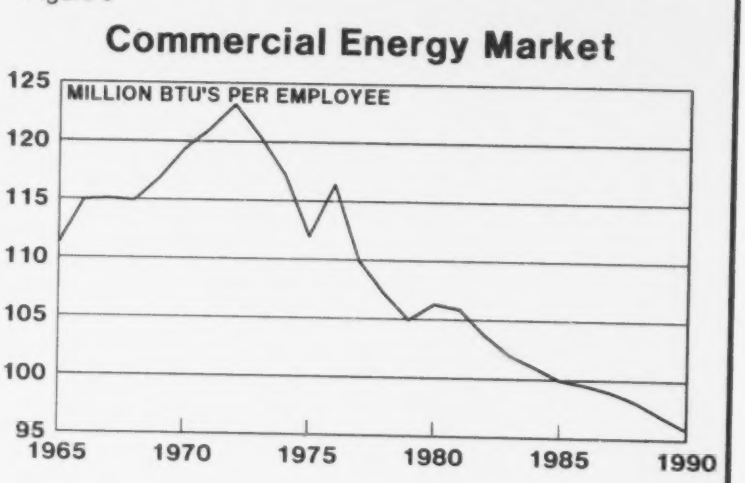


Figure 4

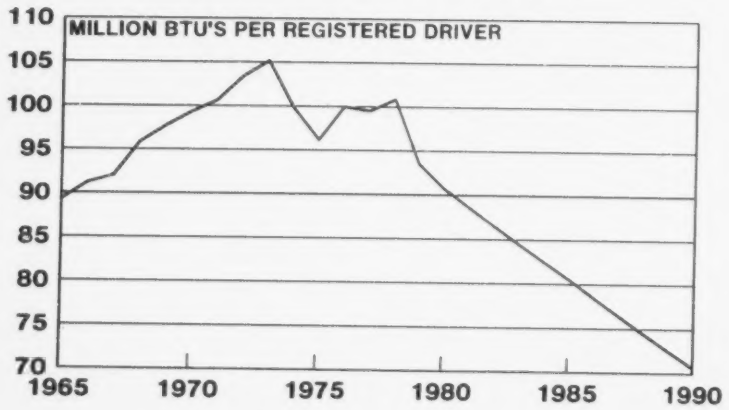
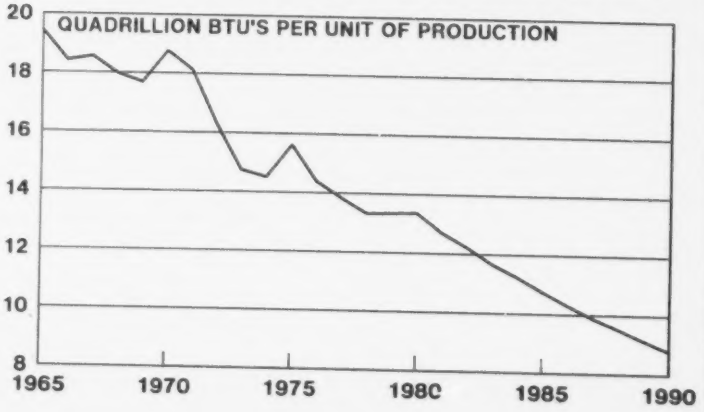


Figure 5



KEY FINDINGS

The following are the key findings from this report:

Total Domestic Energy

- Total energy demand grows at 1.2% annually during the '80s, one-half the rate of the '60s and early '70s.
- Higher energy prices, greater conservation efforts, and lower economic activity contribute to this slowdown.
- Nuclear, coal, synthetics, and renewable energy supplies will increase, but domestic supplies of oil and gas will be insufficient to meet U.S. needs. Imports of oil and gas show a modest rise by the end of the decade.

Oil

- Total U.S. oil use will plateau at about 17 MM B/D early in the 1980's, bringing an end to the historic trend of increasing consumption.
- Domestic oil supply will decline until the mid-'80s, then begin to rise slightly with new contributions from frontier areas, enhanced recovery production techniques, and the introduction of synthetic oils from coal and shale.
- Domestic supplies remain inadequate and must be supplemented by imports of approximately 8-9 MM B/D of crude oil and products throughout the decade.

Natural Gas

- Domestic gas supplies from all sources will decline from 8.6 MM B/D in 1980 to 7.5 MM B/D in 1990.
- Gas from non-conventional sources such as tight sands and synthetic gas from coal will contribute about 1 MM B/D by 1990.
- Domestic gas will be supplemented by imports from Canada, Mexico and liquefied natural gas from overseas. These imports will peak at 1.4 MM B/D in 1985, declining to slightly under 1 MM B/D by 1990.

Coal

- Demand for coal will grow almost 4% AAI in the 1980's, reaching a level of 1.2 billion tons per year in 1990, with exports representing about 10% of total demand.
- Capacity to produce coal will continue to exceed demand.
- Coal use is impeded primarily by the cost of conversion and the problems in meeting air quality standards.

Electricity Sales

- Demand for electricity continues to increase, but the 3% AAI growth rate in the 1980s is less than half the rate of the '60s and early '70s due to the effects of higher prices and efficiency improvements.

Nuclear

- Nuclear plants will generate about 25% of electricity demand in 1990. Although well below the expectations of earlier forecasts, this still represents a 9.6% annual growth rate.
- In 1990, about 9% of our total energy needs will be supplied by nuclear power.

Renewables

- Renewable energy sources (solar, wind, biomass) are in the early development stages. Their contribution by 1990 is therefore small but should increase significantly in the following decade.

- Over half of this energy contribution will come from wood and other waste material.

International

- There is a modest expansion in world oil demand to 76 MM B/D by 1990. This is some 12 MM B/D greater than current levels.

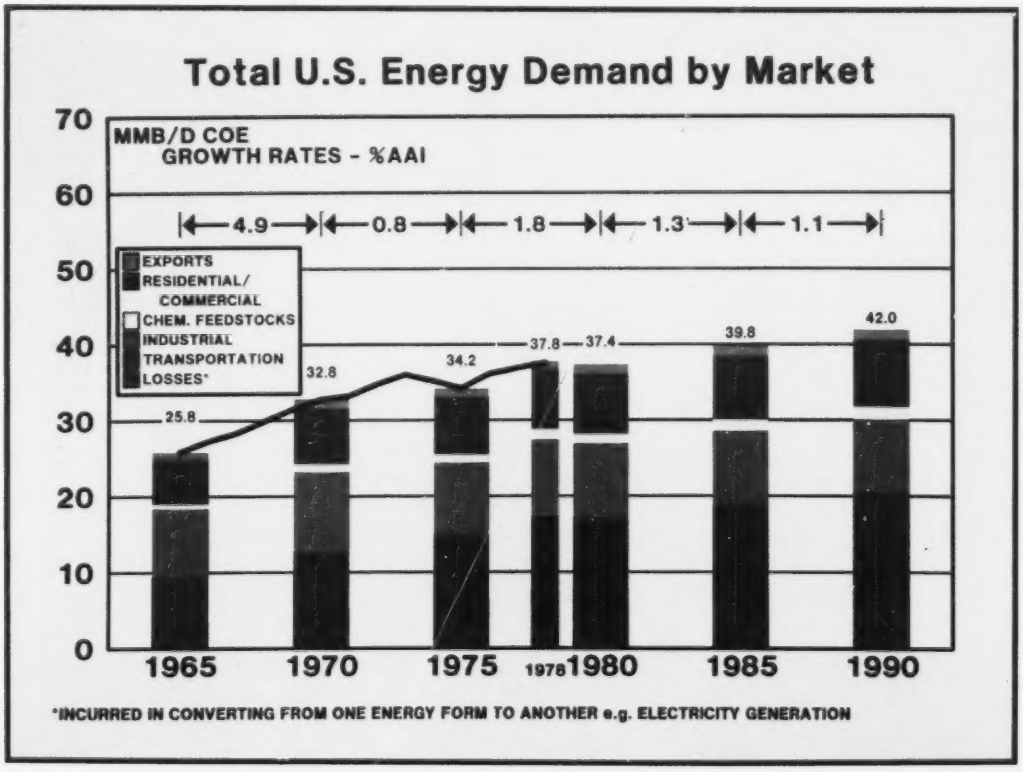
- In the '80s OPEC oil production should rise modestly above current levels, but this incremental supply will be needed for the increasing domestic demands of OPEC members. Consequently, exports of OPEC oil will remain approximately level, in the range of 28-29 MM B/D.

- Supplies of internationally traded oil will remain tight throughout the period.

U.S. ENERGY DEMAND

U.S. energy demand will continue to grow throughout the 1980's (see figure 6), but the rate of growth will be significantly lower than that of the recent past. From 1965 to 1970, U.S. energy demand grew almost five percent a year. The projected average annual rate for 1980 to 1990 is only 1.2 percent. Higher energy prices, conservation, and modest growth in real GNP will all contribute to the low rate of growth.

Figure 6



Demand for energy in the residential/commercial market — homes, stores and office buildings — will grow, but at the same time this sector will become more energy efficient. Its share of total demand will remain constant at about 22%.

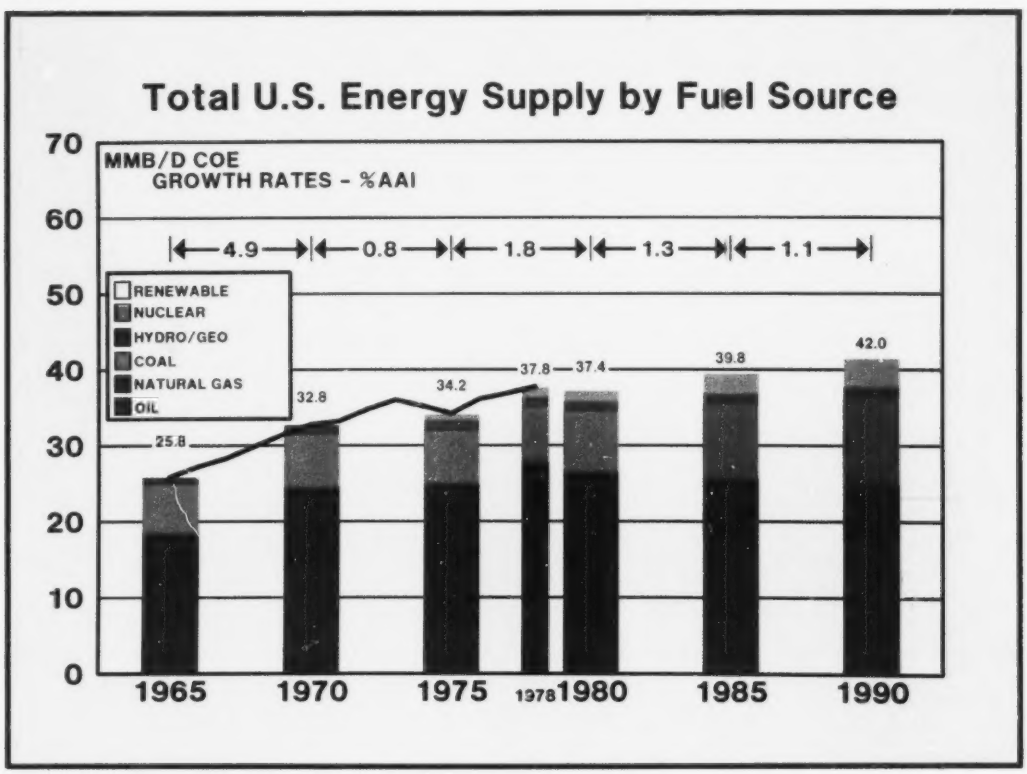
The industrial or manufacturing sector will exhibit a similar pattern. Output of goods will increase, but offsetting decreases in energy needed per unit of production will halt growth in the amount of energy devoted to industrial heat and power.

Energy use in the transportation market (automobiles, trucks, railways, aircraft, etc.) will continue to grow, but only modestly. More fuel-efficient cars will contribute to a lower gasoline demand, nearly offsetting a projected increase in commerical transportation fuel. Due to further penetration of the diesel engine, the demand for diesel fuel rises as that for gasoline falls.

U.S. ENERGY SUPPLY BY FUEL SOURCE

Figure 7 shows the resources expected to supply this country's energy in the future.

Figure 7



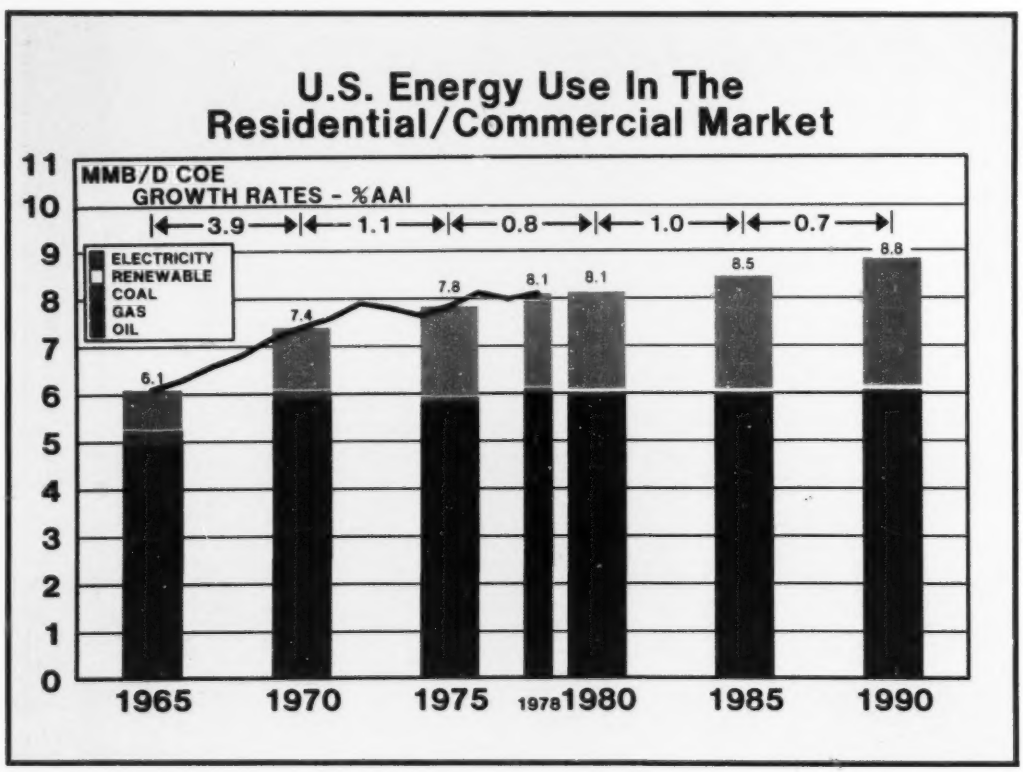
Each demand market requires fuels for which there are few easy short-term substitutes. While there is some interfuel flexibility, time and economics conspire to prevent rapid production changes in patterns of consuming devices. Consequently, oil and gas will continue to provide major shares of the nation's energy, about 59 percent of total supply in 1990.

Use of coal and nuclear power will grow, but contributions from sources such as hydro-power, geothermal, and solar will be relatively limited through the 1980's. There are few appropriate sites for major new hydro-power projects, and the geothermal resource base is small. Solar power boasts great potential, but technical and economic hurdles will deter major contributions from solar in this decade.

U.S. ENERGY DEMAND IN THE RESIDENTIAL/COMMERCIAL MARKET

Energy that will be needed by the residential/commercial market is shown in figure 8. (The commerical market includes stores, office buildings, schools, hospitals, public buildings, large apartment buildings, etc.) While the number of houses and commercial buildings will increase, energy efficiency improvements and conservation (figures 2 and 3) will hold down overall consumption increases in this sector. On a net basis, electricity will provide the additional energy the residential/commercial market will require. Oil and gas together provide about the same amount of energy throughout the period, with gas demand growing slightly and oil declining.

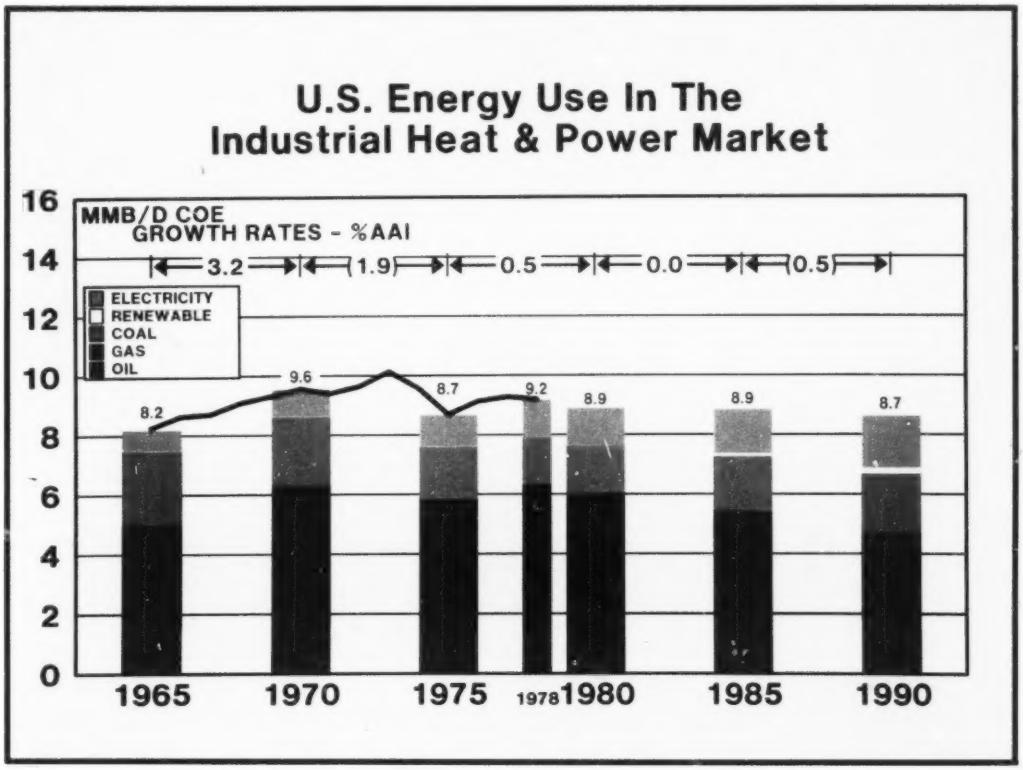
Figure 8



U.S. ENERGY DEMAND IN THE INDUSTRIAL HEAT AND POWER MARKET

U.S. industry has been especially effective in energy conservation efforts (figure 5). Thus far, prevention of waste has received more attention than efficiency improvement, because it offers near-term benefits and requires less investment. As cost and supply problems intensify in the Eighties, efficiency of fuel use will be emphasized. As figure 9 shows, energy demand for industrial heating and power does not grow, even though more industrial goods are produced. Gas and oil use will decline while consumption of coal and electricity increases. A modest but growing use of renewable energy, largely combustible wastes, is worthy of note.

Figure 9

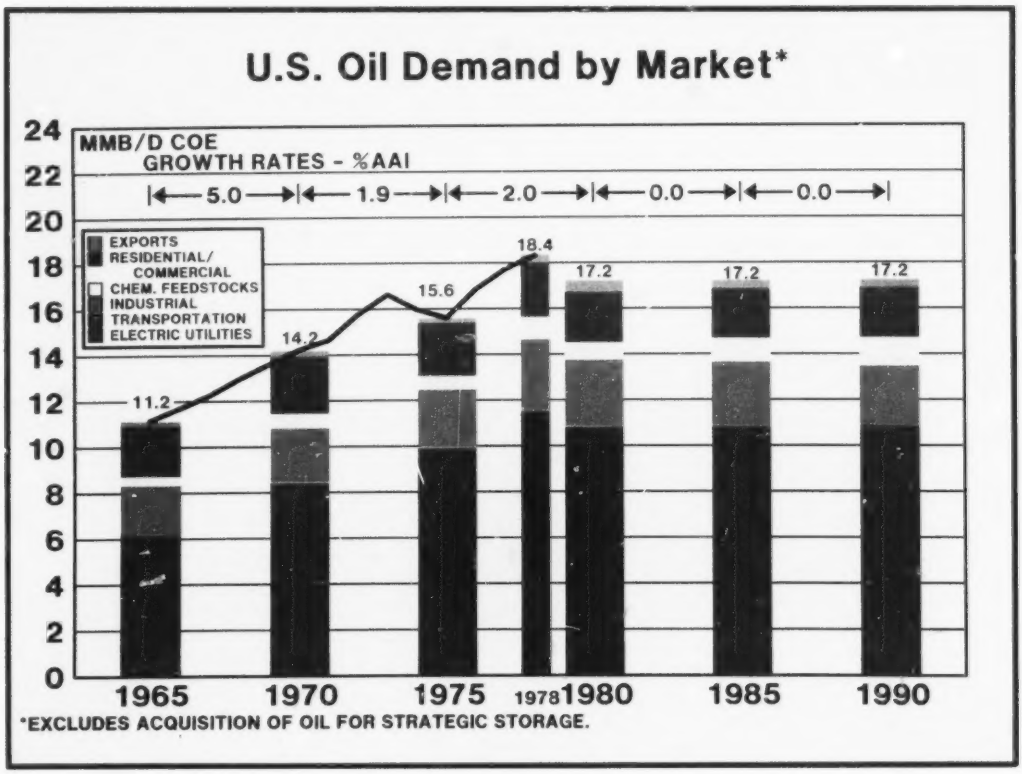


U.S. OIL DEMAND

The demand for oil is expected to remain constant in the 1980's, ending an historical upward trend (see figure 10). Continuing gains in energy efficiencies in all oil markets and the gradual replacement of oil by coal and nuclear power in the generation of electricity will account for the change.

Transportation will continue to be the largest market for oil, taking 57% of total oil needs in 1990. Mandated fuel efficiency improvements for automobiles and the high cost of gasoline are strong elements in the sharp change in oil demand.

Figure 10



Oil use in the residential/commercial sector will remain about the same through the decade. The industrial market will seek further fuel efficiencies and replacement fuels for oil, but opportunities for a near-term switch to coal are limited. A slowly declining oil demand for this market is projected.

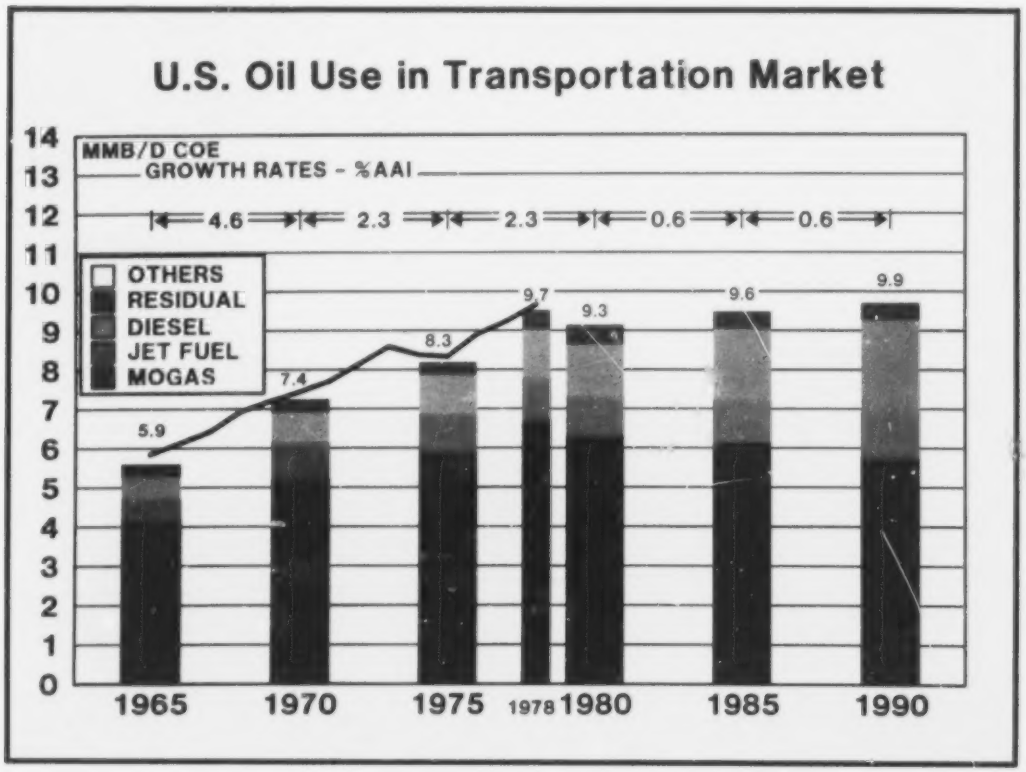
Use of oil for petrochemical feedstocks will increase an average of 5.2 percent a year. This represents a strong chemical market growth and reflects only an emerging use of coal for feedstocks.

Electric utilities will steadily decrease oil demand; coal and nuclear power have already begun to replace residual fuel oil because of the Fuel Use Act, which prohibits the construction of new oil-burning boilers.

U.S. OIL USE IN THE TRANSPORTATION MARKET

The transportation market (figure 11) claims over half of total oil demand in the United States. Demand growth here will slow to an average annual increase of less than 1 percent (1980-1990). Substantial improvements in fuel efficiencies of automobiles, trucks, and aircraft, the increased use of mass transit and carpooling, and more efficient airline load factors all will contribute to the reduction in growth of consumption. Gasoline consumption declines about 1% per year as the more fuel-efficient automobiles grow in number. Passenger car fleet miles per gallon will go from 13.3 in 1978 to 19.6 in 1990. By 1990, we expect about 6% of the automobiles and light trucks to be diesel-powered, and many local delivery trucks, which have historically been gasoline-powered, to be replaced by diesels.

Figure 11



U.S. OIL SUPPLY

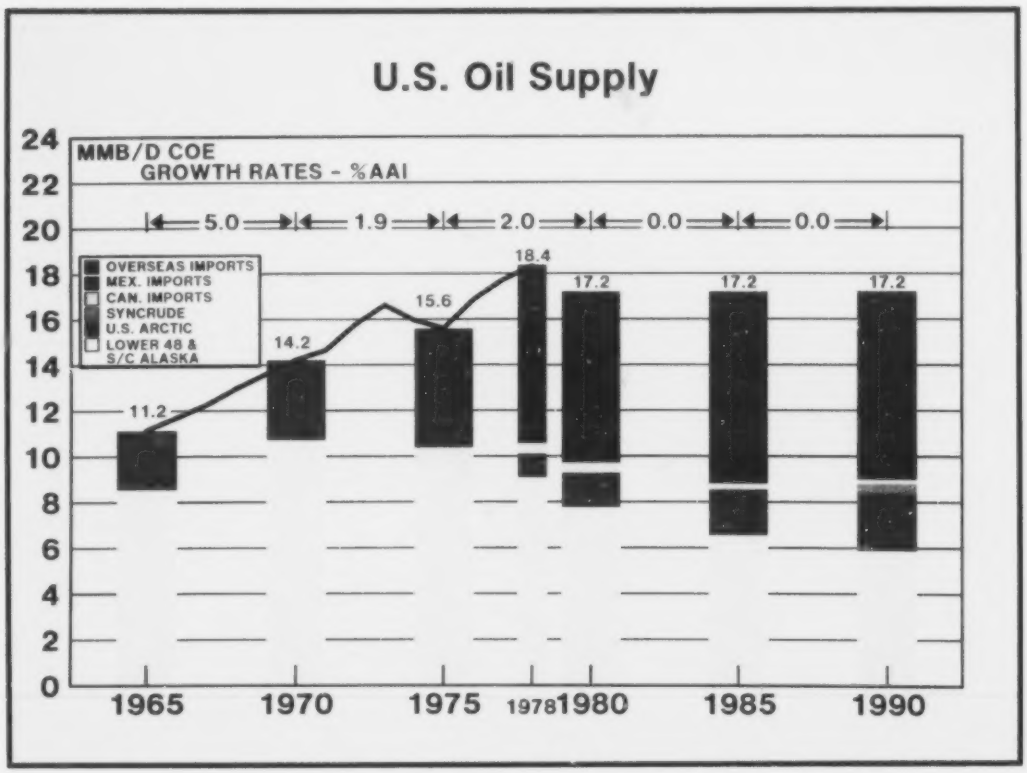
The major source of U.S. energy through the decade will be oil. The total supply from all sources will be constant at about 17.2 MM B/D (figure 12). By 1990, imports will still account for about 50% of the oil the nation uses.

Domestic oil supply, including that from Alaska and small amounts from coal liquefaction and shale, will range between 8.5 and 9.0 MM B/D between 1985 and 1990. About a third of domestic production in 1990 must come from reserves which have not yet been discovered.

Enhanced recovery techniques — heavy oil steam drive, carbon dioxide injection, chemical flooding, etc. — will provide about 1 MM B/D by 1990. There are wide variations among crude oil reservoirs, and no one supplementary recovery method will be applied to all situations. Thermal recovery of heavy oil will be the most commonly applied technique during the Eighties.

By the mid-1980's, U.S. import requirements will peak at about 8.6 MM B/D.

Figure 12



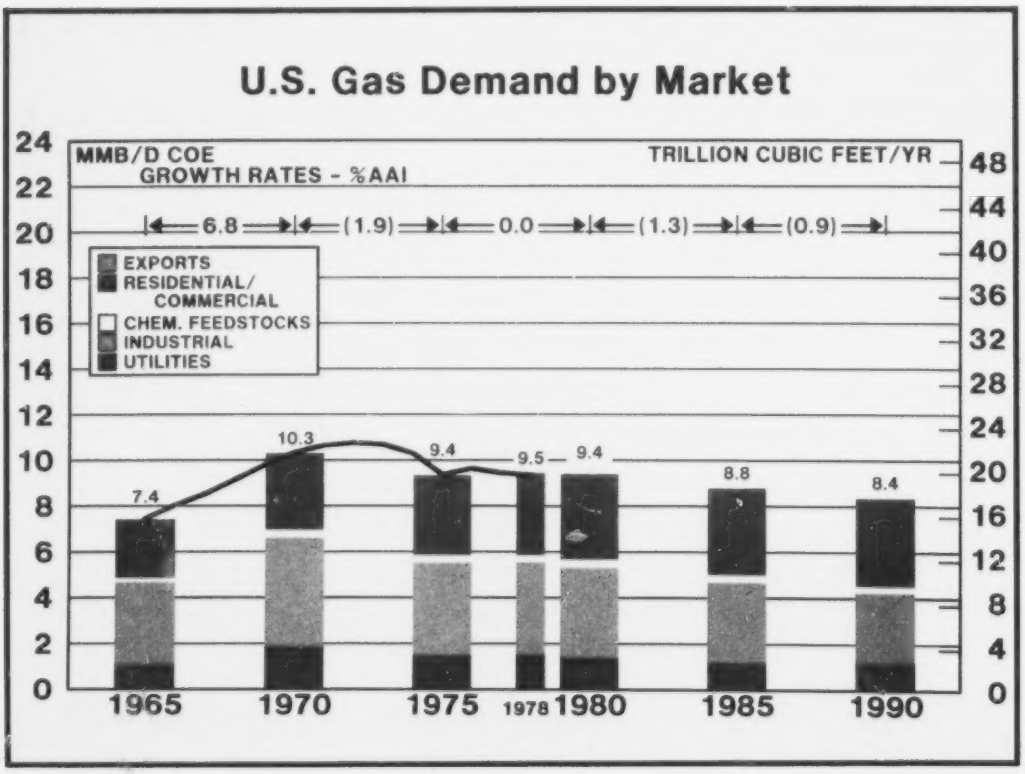
U.S. GAS DEMAND

Natural gas is a preferred fuel even though supplies are diminishing. Given these conditions, gas demand is really allocation among users based on generally accepted priorities (figure 13). The residential/commercial market has first call, and by 1990 will account for 46% of gas consumption.

During the 1980's, industry's use of gas will decline by 2.6% a year. Electricity will replace some gas now used in processing, and coal will begin to phase out gas now fueling boilers and generating electricity. Gas, where it is available and when oil is the alternative, will continue to generate some base-load electricity. Gas will also be a preferred fuel for peak electric power generation.

Use of natural gas as chemical feedstock will remain near current levels for the near-term, declining somewhat by 1990.

Figure 13



U.S. GAS SUPPLY

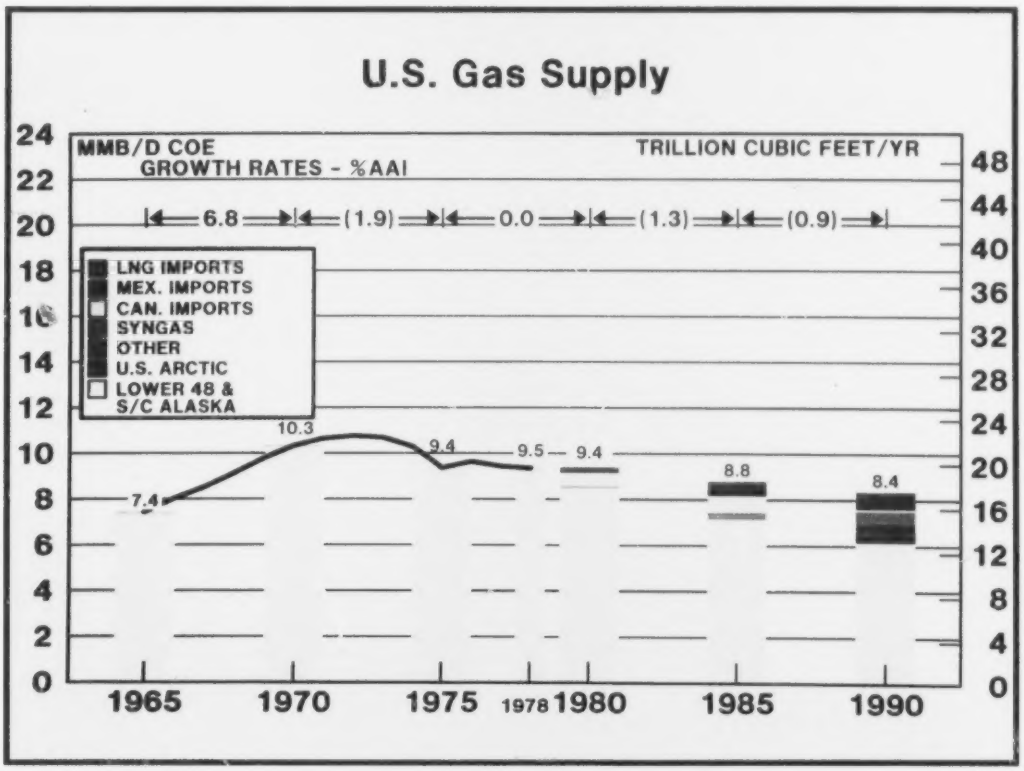
Natural gas supply will decline throughout the 1980's despite new Alaskan gas, additional discoveries in the Lower 48, expanding imports and non-conventional gas supplies. The decline will reflect the maturity of the large reserve base in the Lower 48 states (see figure 14).

Even with this decreasing supply, approximately 40 percent of 1990's domestic production must come from reserves yet to be discovered.

Canadian and Mexican imports as well as liquefied natural gas imports will make significant contributions. Some synthetic gas derived from coal will appear in the middle 1980's. Synthetics, however, will not be a major source in this decade.

Additional natural gas, from tight sandstone formations are expected to provide approximately 0.5 MM B/D by 1990.

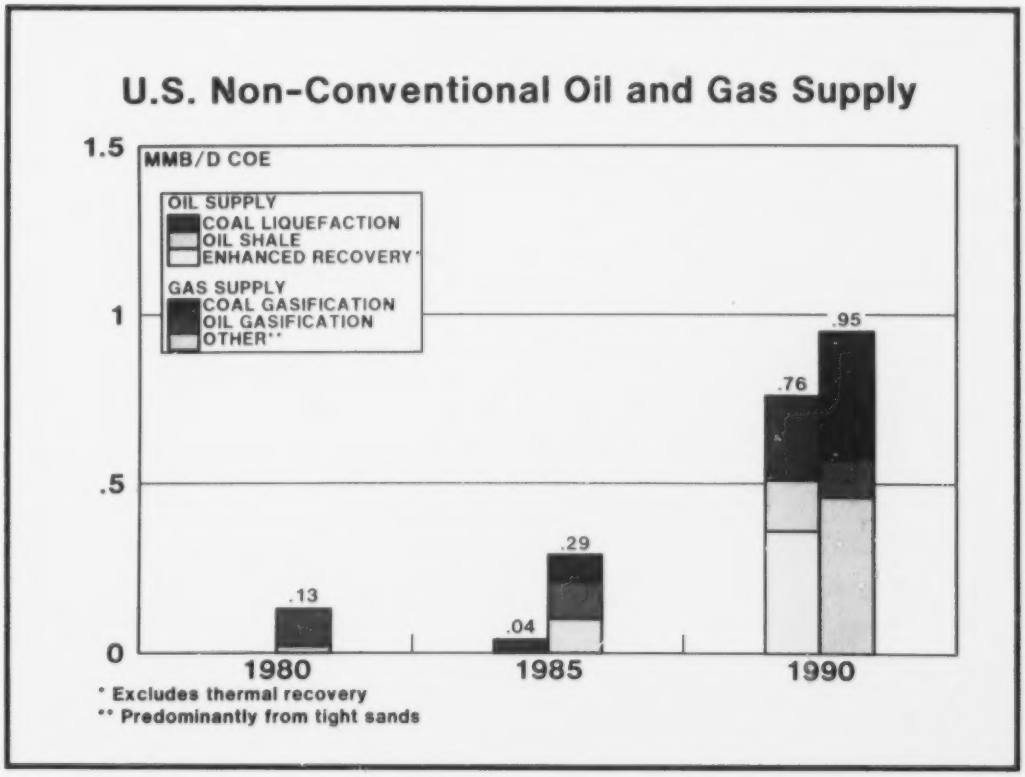
Figure 14



U.S. NON-CONVENTIONAL OIL AND GAS SUPPLY

One way to reduce energy imports is to produce from new, non-traditional sources. Gas and oil can be derived from coal, and petroleum extracted from certain shale rock. In both cases the nation possesses large potential reserves, but with current economics and technology such conversions are not yet ready for large scale commercial application. By the mid to late Eighties, however, technological improvements and experience will permit coal gasification and liquefaction, and shale oil production to make noticeable contributions to our energy supply. By 1990, about 1.7 MM B/D of oil and gas will come from these sources (figure 15).

Figure 15



U.S. COAL DEMAND

Coal is this country's largest fossil fuel resource, holding an enormous energy potential.

Coal's market growth in the 1980's (see figure 16) is about 4% AAI, amounting to approximately 1.2 billion tons in 1990; however, this is less than the potential growth of supply (ca 5% AAI). Coal is, therefore, considered "demand-limited" throughout the period. Demand is constrained by the time needed to build new coal-burning facilities and by government regulations such as the Clean Air Act.

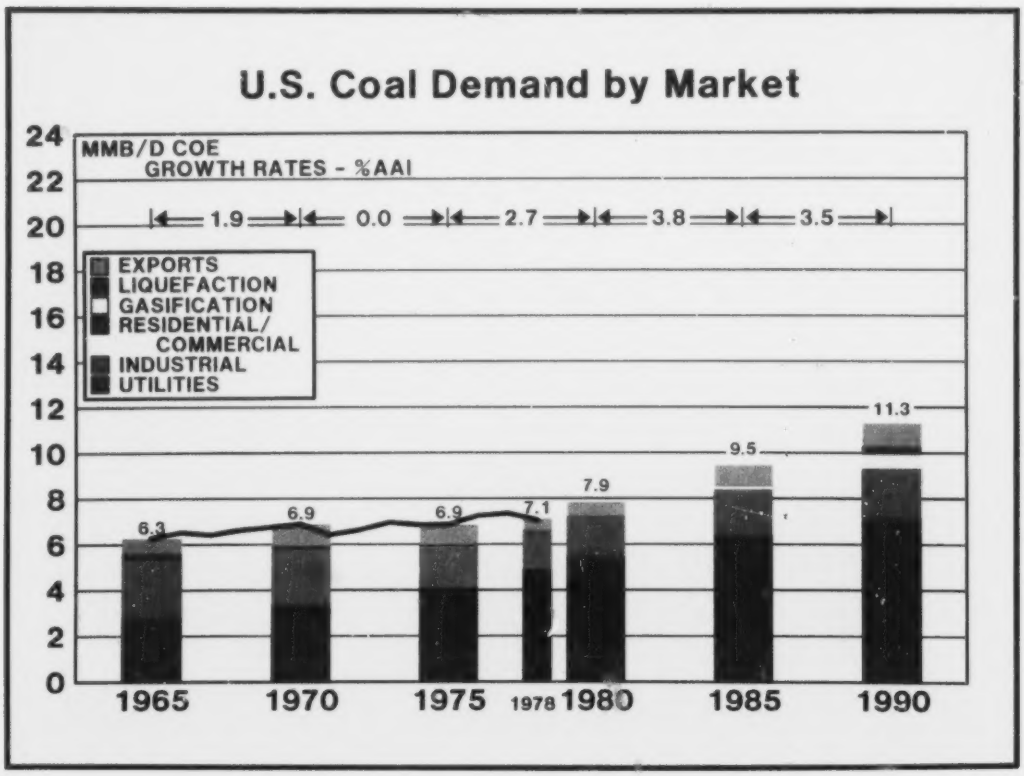
Over 60% of the coal will continue to be used in electric utilities. Synthetic gas and oil production will mean a small but growing market, building to about 100 million tons in 1990.

An historical decline in coal use by industry will reverse, then grow about 2% per year between 1980 and 1990.

Large Western surface mines will account for expanding shares of total domestic coal production.

Regulatory constraints will mean regional limitations on both the mining and consumption of coal. Other regional problems include high state severance taxes, rail transportation limitations, and right-of-way acquisition for slurry pipelines. East Coast port facilities will need improvement to realize the long-term export potential of coal.

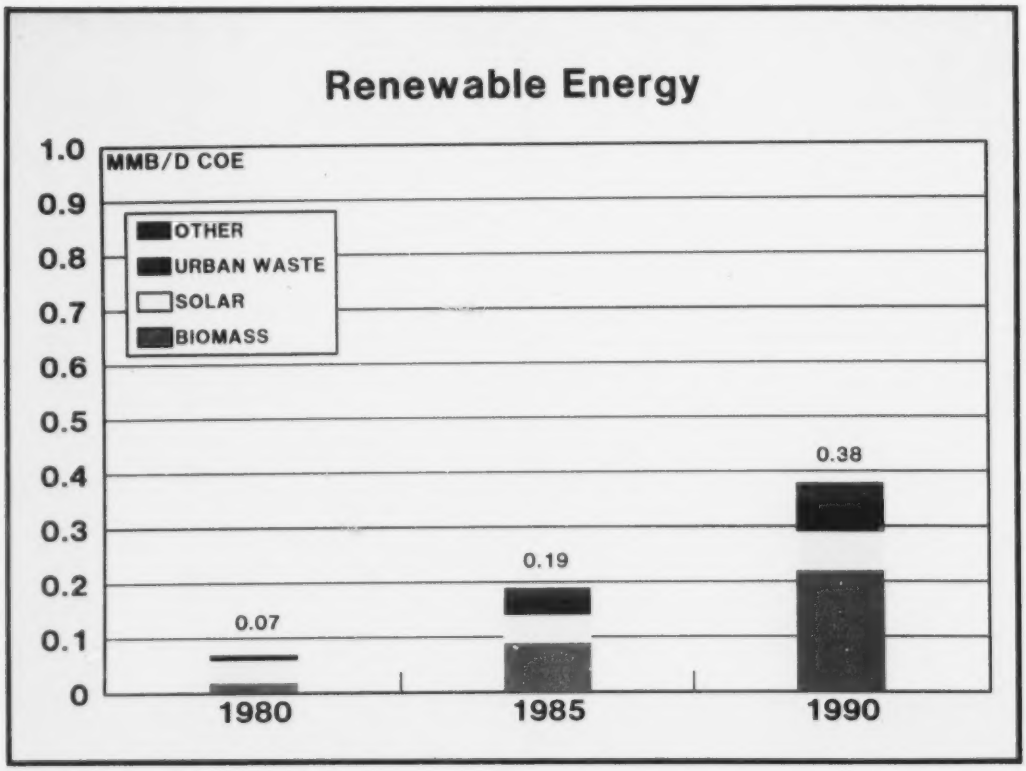
Figure 16



RENEWABLE ENERGY

Renewable energy sources will not make a major contribution to total energy needs in this decade. These sources will expand, however, as opportunities are presented, and by 1990 account for some 400,000 B/D. In figure 17, "biomass", mainly the burning of wood and wood wastes, is the fastest-growing renewable resource. The use of wood is probably greater now than is shown in the figure, but reliable statistics are not available. Alcohols (for example, gasohol) and methane from waste are also included in the "biomass" category, but their combined share is small. Direct solar heating and solar electricity grows slowly, being limited by high initial costs, institutional and technical problems. Other minor energy contributions will come from urban wastes, wind and low-head hydroelectric power.

Figure 17



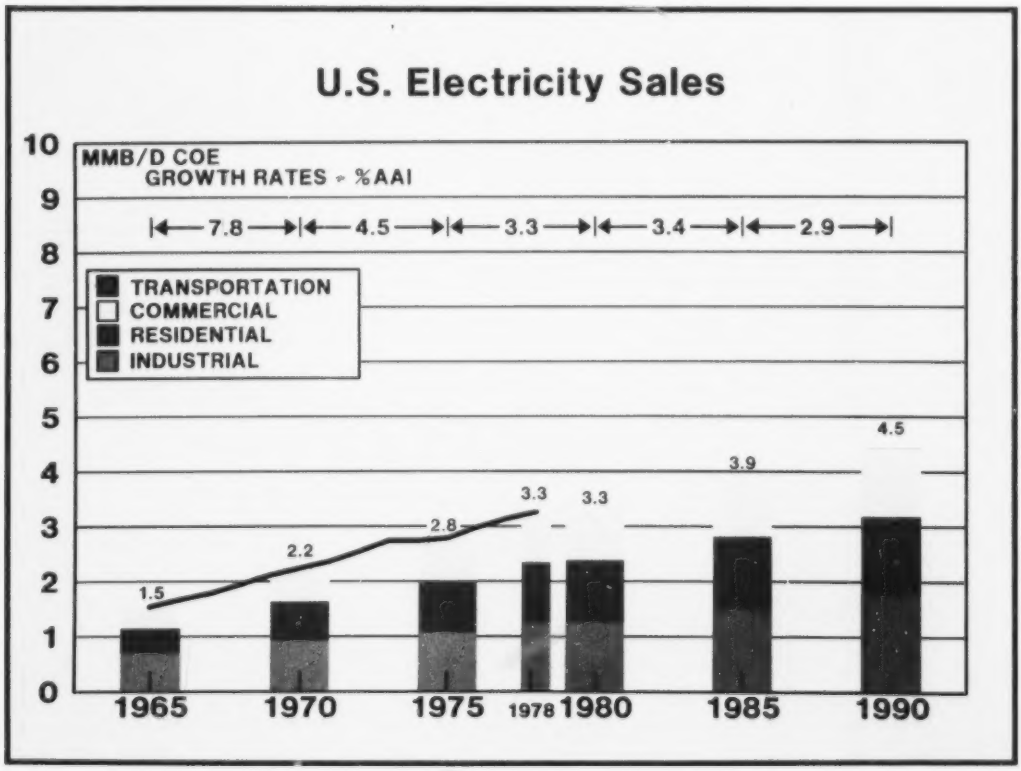
ELECTRICITY SALES

Electric power demand grew rapidly, 7.4% a year, in the '60s, then slowed to about 4½% AAI in the mid-'70s. In the 1980's that growth is expected to be about 3% AAI — lower than earlier projections but still substantially greater than the growth of total energy demand. (Figure 18). Generally lower economic and demographic projections, and the expected increase in the real price of electricity and resultant conservation, account for the reduced projection.

Industrial use of electricity, reflecting its substitution for fossil fuels, will grow more rapidly than that of other sectors of the economy.

Residential/commercial growth will be moderate, with some increase in electrically-heated homes.

Figure 18



ELECTRICITY GENERATION

Figure 19 shows energy required by utilities for electric power. A comparison of figure 18 to figure 19 indicates that energy used for generation is roughly three times the energy received as electricity. The loss occurs during generation and transmission of the electricity.

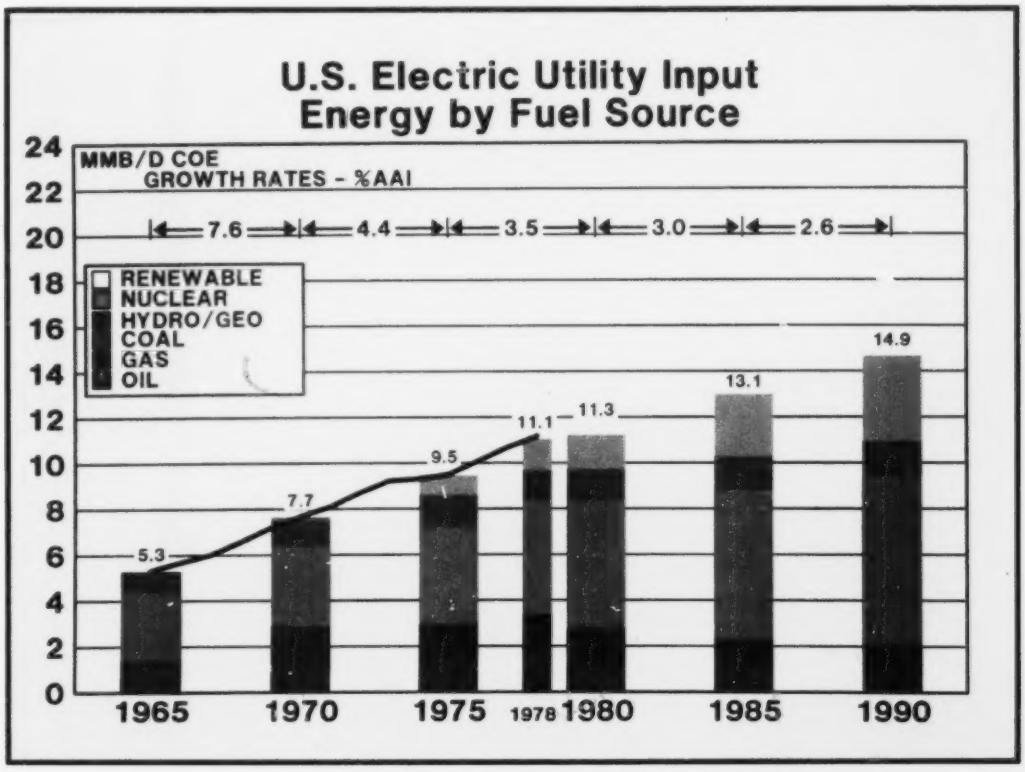
Continuing utility plant efficiency improvements will have a slight effect on such energy losses. Energy devoted to electricity generation will increase 2.8% annually through 1990, while sales of electricity grow 3.0% a year.

Coal will continue to provide the bulk of energy required for electric power generation, increasing 2.8% per year through 1990.

Electricity generation by nuclear energy will also increase, going from about 9% of all electricity in 1975 to 25% by 1990. Continuing regulatory problems will hamper nuclear development; licensing and construction time for a nuclear plant is now more than ten years.

The use of natural gas and oil to generate electricity will decline. With few exceptions, new boilers will not rely on these fuels.

Figure 19



U.S. ENERGY IMPORTS/EXPORTS

Shell's outlook indicates that, even with reduced energy demand growth, domestic energy production will not meet domestic requirements. The United States must continue to import oil and gas.

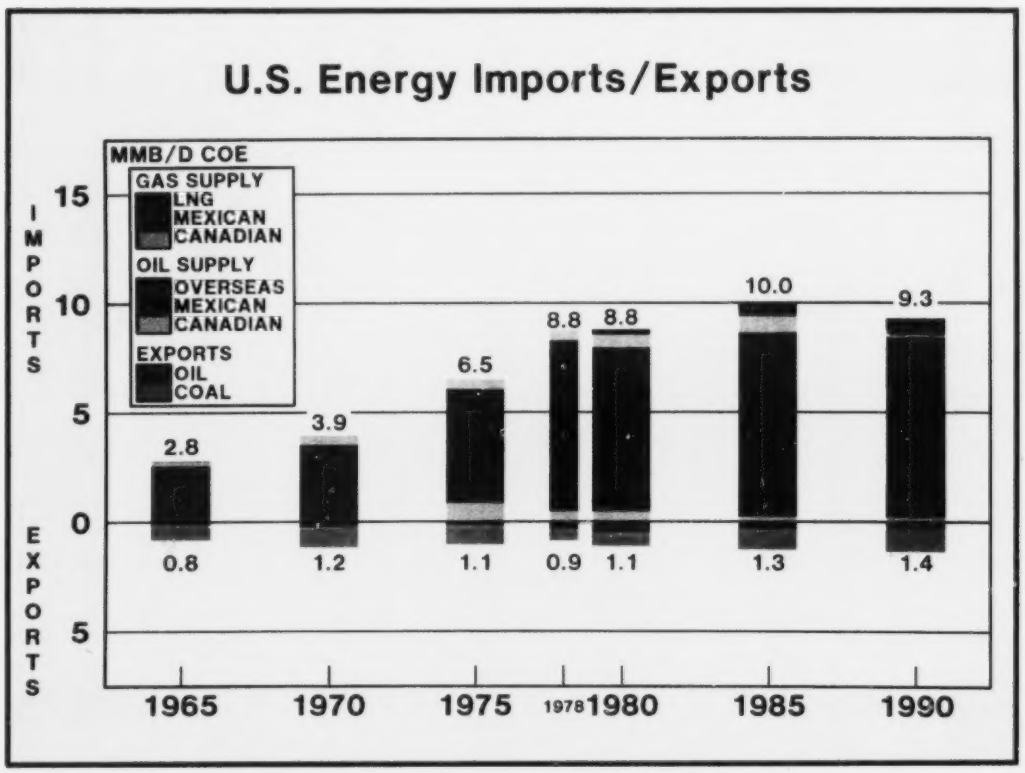
Oil imports (figure 20) will increase about 1.7% annually until the mid-1980's, when imports will be between 8.5 and 9.0 MM B/D. It is expected that imports will then level off and by 1990 decline slightly to about 8.5 MM B/D.

Imported gas will follow a similar pattern, reaching 1.4 MM B/D in 1985 and falling to 0.9 MM B/D in 1990; 60% of gas imports by 1990 will be liquefied natural gas.

In 1990, imports will supply 22% of America's energy, only slightly less than in 1978. Oil will be 90% of this imported energy.

Exported energy rises from 0.9 MM B/D in 1978 to 1.4 MM B/D in 1990. The major energy export will be coal; exported oil products will be mostly specialties such as petroleum coke and lubricants.

Figure 20



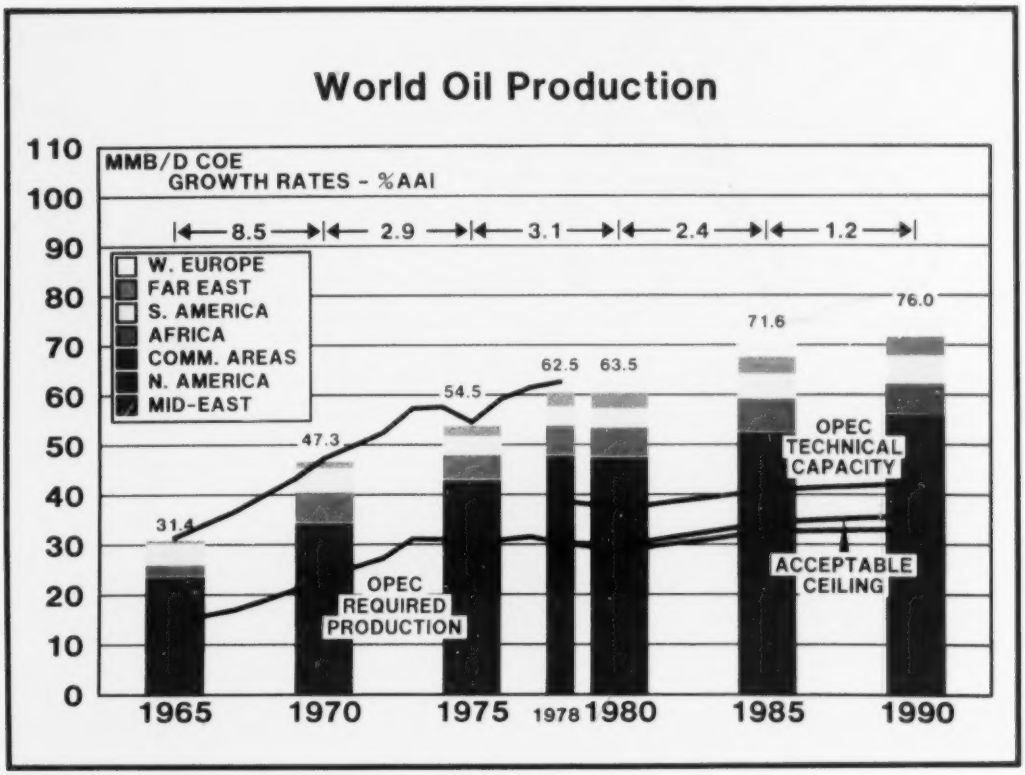
WORLD OIL PRODUCTION

Whether the U.S. can satisfy its need for foreign oil will depend upon future growth in world oil production and the growth in oil demand in other nations.

For a variety of political and economic reasons, worldwide oil production in 1990 is not expected to reach its maximum potential of about 80 MM B/D. However, the production level that will be required to meet world demand of 76 MM B/D leaves little margin for unforeseen operational problems or political unrest (figure 21).

While the production ceiling considered to be acceptable to OPEC members will reach 34-36 MM B/D by 1990, compared with their expected technical capability of 42 MM B/D, exports likely will remain at less than 30 MM B/D through the decade, because of OPEC's own rising domestic consumption.

Figure 21



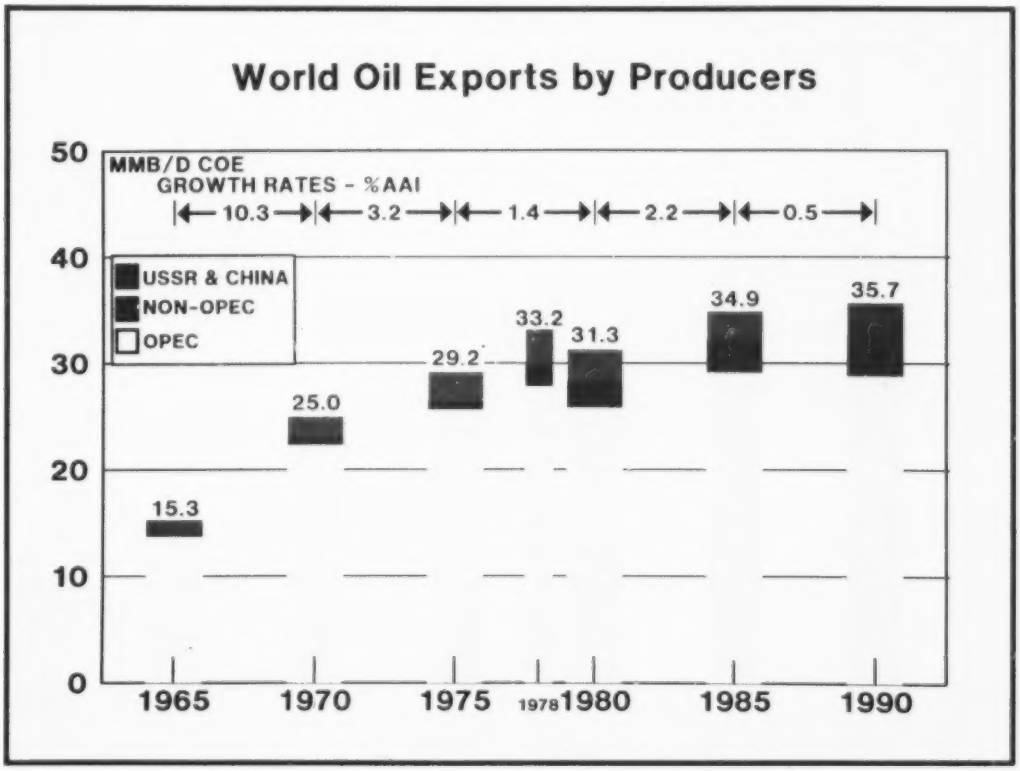
WORLD OIL EXPORTS

After satisfying internal needs, the world oil producers export about 60% of their production (figure 22). During the coming decade, OPEC will continue to dominate the international market, exporting between 28-29 MM B/D, over 80% of the total.

Soviet exports to the West will end, but they will continue to meet part of the growth in Eastern European requirements.

Non-OPEC exports continue to grow, but contribute only a minor part of the oil in international trade. Notable non-OPEC exporters are Mexico, Norway, Malaysia, Brunei and China. During the 1980's several exporters, faced with declining reserves or rising domestic demands, will be forced to reduce exports (e.g., Algeria, Indonesia).

Figure 22



Most of this oil pool is imported by industrialized nations. While this pattern will continue in the 1980's, the underlying growth in oil demand will vary among nations. Oil use will expand most rapidly in the less developed countries, particularly those least dependent upon imported supplies. In contrast, the U.S. and Western Europe will halt growth in oil demand and thereby limit imports.

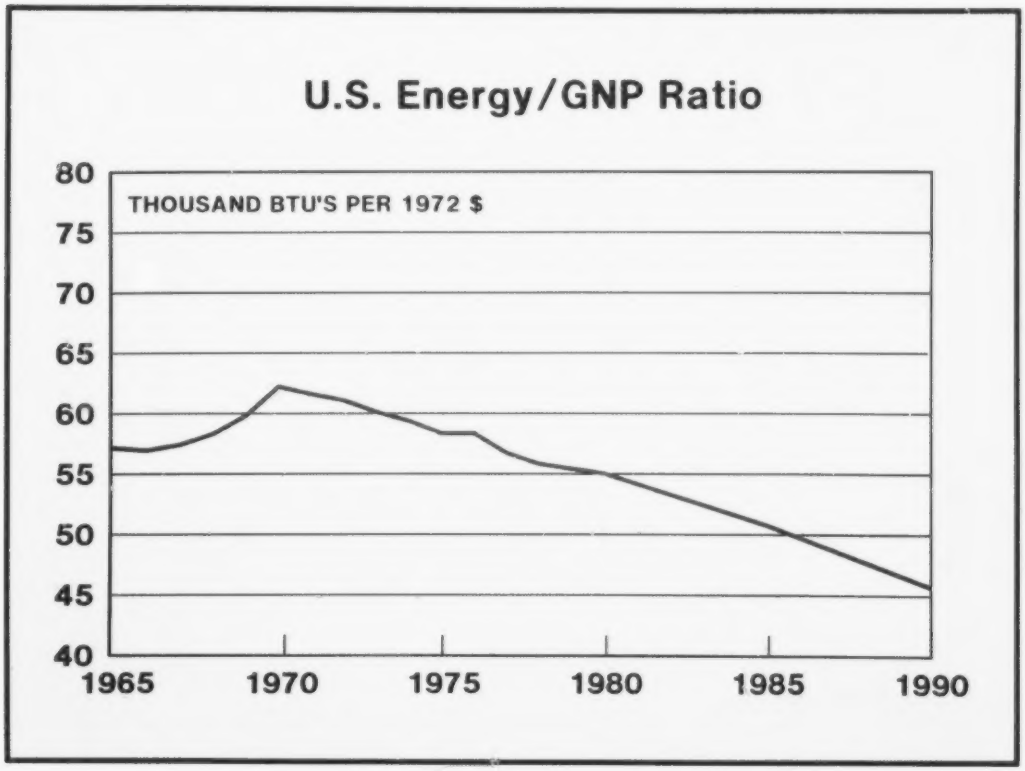
CONCLUSIONS

National energy policy calls for minimizing dependence on foreign oil by:

- Efficient, prudent use of energy — conservation.
- Vigorous development of domestic oil and gas.
- Development of domestic energy forms that supplement and/or replace oil and natural gas. These include coal, nuclear, synthetic oil and gas from coal, shale oil and renewable resources.

Widespread conservation, spurred by rising fuel prices and government policies, has been underway for several years. In this energy projection, conservation efforts are expected to continue, for the same sorts of economic and political reasons as in the 1970's (figure 23).

Figure 23



Developing new domestic energy will be more expensive than in the past. Discovery and production of the traditional fuels, oil and natural gas, will take place under more difficult conditions such as offshore Alaska. Our Outlook expects further contributions of oil and gas from both conventional and other sources (Alaskan oil, heavy oil, gas from tight sands, etc.). However, the Outlook also assumes that the development of domestic oil and gas will continue to be held back by federal land use

and leasing policies and by the subdued pace of offshore leasing. We believe this to be a less than vigorous effort and that with federal policy changes, additional oil and gas — perhaps 3 MM/BD COE above what will otherwise be the case — could be in production in the early 1990's. An indication that extra effort is needed is the level of energy imports still required in 1990.

Development of domestic synthetic and renewable fuels has begun, although technical, environmental and economic problems remain. These problems will be solved by the end of the decade and major energy contributions from these sources should be realized in the 1990's.

We have evaluated this projection in the light of other important resources — skilled manpower, materials, fabrication capabilities, and capital. No significant impediment to the achievement of the projections was found.

This coming decade will be one of much change: new energy policy and regulation will be forged through the balancing of conflicting economic, environmental, and resource allocation objectives.

The lessons of the 1970's tell us that when developing national energy policy and regulating in the face of uncertainty, detailed and narrow point-by-point prescriptions of action and the application of preconceived specific solutions lead to unnecessary controversy, frustration, inflexibility and delay.

Instead, what is needed now, is a general energy strategy, supported by a set of rational operating principles, from which energy planning and required legislative action can be developed. Such a program draws on our existing strengths while providing the necessary flexibility, so that the unfolding energy transitional period can be made relatively smooth.

All of us have a tremendous stake in energy. Jobs, the nation's way of life, American overseas trade, and foreign relations are affected. The problems are complex, but the solutions are within our grasp. We must waste no more time; a national commitment and involvement by all of us is imperative.